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ABSTRACT

After considering the advent of knowledge about prereading from a longitudinal perspective, this report then reviews the research on preschool children's attempts to read and offers a discussion of cross-sectional research on both prereading and beginning reading. The discussion is organized in terms of three hypothesized strands of prereading: reference, phonological awareness, and knowledge of terms and rules. When possible, the discussion is oriented toward the child's view of reading and its social and communicative value. The child's competencies and learning environment are featured in order to demonstrate that the proposed three-strand construct is supported by developmental and reading research and can be used to organize instructional questions. (Author/FL)

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Technical Report No. 198

PREREADING: A DEVELOPMENTAL PERSPECTIVE

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Abstract

The advent of knowledge about reading (prereading) is considered first from a longitudinal perspective, with a review of research on preschool children's attempts to read. This is filled in with cross-sectional research on prereading and beginning. The discussion in both sections is organized in terms of three hypothesized strands of prereading, reference, phonological awareness, and knowledge of terms and rules. Where possible, it is oriented toward the child's view of reading and its social and communicative value. The child's competencies and learning environment are featured in order to demonstrate that the proposed three-strand construct is supported by developmental and reading research and can be used to organize instructional questions.

Prereading: A Developmental Perspective

> Pip: "I struggled through the alphabet as if it had been a bramble bush; getting considerably worried and scratched by every letter. After that, I fell among those thieves, the nine figures, who seemed every evening to do something new to disguise themselves and baffle recognition. But, at last I began, in a parblind groping way, to read, write, and cipher, on the very smallest scale." (Dickens, from Great Expectations, p. 33)

What does a child know about reading before beginning to read in school? The answer depends not only upon the opportunities a child has to learn about letters and to have words identified and stories read but also upon the relationship between language and prereading. Yet the nature of this relationship is unclear partly because of differences in methodology or because different questions have been addressed. While language research has relied on diary studies, reading has more often been studied cross-sectionally in terms of its correlations with social, educational, cognitive, or linguistic factors. While language competency is assumed to derive from the child's understanding of its principles, reading acquisition is usually assumed to be a function of explicit instruction. While parents are seen to play a crucial role in children's language development, there is no more than a token acceptance that reading could be learned through interaction with parents. Thus, even though it is generally agreed that reading and language are related, there is little accounting for this tie in research on reading acquisition.

We will assume here that there is a close tie between language and beginning reading. To understand what reading is all about, the young child must realize that language is comprised of words and sentences that correspond with similar units of print. Beyond that, the child must recognize sounds in words that are mapped onto letter sounds. Thus, the stream of speech must be broken at junctures that correspond to discrete written units, words must be broken into phonemes, and phonemes related to single letters, letter clusters, and syllables.

When a child begins to consider printed words, a likely first step is to recognize that printed forms of familiar names of objects, actions, and frequently spoken phrases are discrete units, bound by spaces, replicable by a more or less uniform sequence of letters, recognized in a left to right direction, etc. Through tasks of attempting to recognize, print, and spell words, the child will soon realize that words can be broken into smaller units which in many cases correspond to names or sounds of letters. These phonological considerations utilize an entirely new insight about print. At this point, then, a child is bound to construct hypotheses about print in order to solve the deeper problem of how meaningful utterances, speech sounds, and printed symbols are related. In addition, the child will learn to talk about reading and to abide by rules governing the act of reading. Thus, there appear to be three aspects of language which precede and accompany beginning reading: (a) determining junctures in common between speech and print, (b) breaking

speech sounds into the abstract phonemic units that correspond to letters and letter groups, and (c) acquiring labels, rules, and procedures needed to describe and carry out reading tasks.

If we assume that these characteristics are initiated (though not fully understood) before a child reads independently, prereading can be defined in terms of a three-strand construct. The first strand will be called reference; it is similar to the term segmentation used by Menyuk (1976) and is included in Ehri's (1979) notion of "amalgamation." When the child begins to try to read, discrete units from print must be referenced to speech and objects. While the child probably starts by recognizing labeled objects, familiar phrases and sentences and then novel sentences will eventually be read. The second is called phonological awareness.[1] The concept, but not necessarily the term, has been described by Calfee (1977), Downing (1973), Liberman (1970), Mattingly (1972), Rozin and Gleitman (1977), Barron (Note 1), Downing (Note 2), Gleitman (Note 3), Mattingly (Note 4), Samuels (Note 5), Valtin (Note 6). For prereaders it is an explicit awareness that there is an interrelatedness between letter symbols and words. It appears to be initiated by matching consonant sounds with the initial phoneme in words and continues to an eventual recognition of many phonological patterns and related orthographic structures. The third is termed labels and rules (Clay, 1972; Downing, 1972; Hardy, Stennett, & Smythe, 1974; Hillerich, 1978; Johns, 1972; Reid, 1966), an understanding of terms that are used to talk about reading (e.g., "find

a word . . .," "look at the top of the page," or "read the first sentence") as well as the arbitrary rules that govern the act of reading (e.g., knowing that one reads from left to right, that punctuation is important, and what spaces between letters mean).

While all three strands have been separately described and related to reading, they have not been considered simultaneously in terms of a single developmental construct. If they are considered together, it becomes possible to define prereading in terms of the acquisition of the early or initiating concepts related to each strand. First, it is conjectured that some of the concepts surrounding all three strands are acquired before a child can read independently. Second, it is assumed that some concepts related to referencing are realized before those related to the other two strands, for without distinguishing print in terms of meaningful objects and units of speech, reading cannot make any sense. To consider this model visually, imagine three interwoven ribbons that are hung vertically. The top is labeled "prereader," the middle, "beginning reader," while at the bottom is "mature reader." At the top the ribbon labeled "reference" is very thick; the others are barely visible. Later, one or another strand predominates, becoming thicker, while the reference ribbon diminishes in width (and importance for learning).

We can now, in the light of the foregoing, consider afresh the question that was raised initially. What does a child know about reading before learning formally to read? The first point to be made is that acquisition of concepts about the phonological system and an ability to talk about reading will not appear before reference, but some knowledge of all three strands will appear before a child reads well. Even when it seems that the first thing children are taught is to analyze words into letter sounds, the model predicts that success at this effort will only occur if the children have already acquired some preliminary information about how speech is related to print. Since children see many words on printed signs, labels, and billboards and try to read, spell, and write them, they have usually acquired a sufficient conceptual frame about referencing oral to written words so that they can profit from instruction focused on the other strands.

The second point to be made is that to understand what children know about reading before being formally instructed, the methodology favored to investigate language ought to be appropriate for the study of prereading. One aspect of this methodology was described by Bruner (1979), who pointed out that the study of language should investigate not merely the syntax, semantics, and phonology of language, but also pragmatics--the study of the use of language in its social and communicative context.

> One must devise ways of investigating the constituent skills involved in language. And typically one begins well before language begins, following the communicative behavior of

particular children until a particular level of linguistic mastery is achieved, testing as well for other, concomitant indices of growth. (p. 65)

This recommendation will be followed here by considering prereading first from a longitudinal perspective, beginning well before skilled reading is achieved and following the attempts of children to read. This will be filled in with cross-sectional research on prereading. The discussion will be organized in terms of the three hypothesized strands that are initiated before a child reads and that carry the necessary conceptual frames for understanding how to read. Where possible, it will be oriented toward the child's view of reading and its social and communicative value. The child's competencies and learning environment are featured because it is hoped thereby that the instructional controversies which permeate this field (particularly regarding initiating and sequencing beginning reading lessons) will be avoided. My aim here is to demonstrate that the three-strand construct proposed above is supported by developmental and reading research and can be utilized in order to consider instructional questions. Throughout this chapter, the term "reading" will be used to mean an ability to recognize and verbalize some novel printed words as well as to comprehend some texts. "Prereading" will refer to knowledge and skill which precede reading.

Longitudinal Studies of Prereading

Unlike research into the inception of speech, there are few reported studies of children's acquisition of reading. Only three offer more

than anecdotal evidence of children's progress. Even so, and in spite of the fact that parents probably help their children learn about reading in dissimilar ways, the reports are remarkably alike. The first examples are taken from authors' summaries of parent interviews.

A 5-year-old black child from a lower-middle social class home who could read and write before beginning kindergarten was studied by Torrey (1969). The mother reported that no one had taught him or even encouraged him to learn. However, parents noticed that before he began reading he had learned to recite all the TV commercials. Subsequently he began reading labels from food packages, boxes, and cans. Torrey determined that his language development was typical for the age and his verbal IQ was 96 with a performance IQ of 111.

Durkin (1966) found only 49 children out of 5,103 in Oakland, California (in 1958) and 180 children out of 4,465 in New York (in 1961) who could read a list of primary-level words at the beginning of first grade. The following excerpts were obtained by Durkin from the parents of these readers in response to the questions, "How did your child first show an interest in reading?" and "Can you remember what might have encouraged the interest?"

> . . . it was a combination of people who had helped Paul to read early, chiefly by answering his many persistent questions about words that interested him. In time, the mother said, she herself grew tired of "running to Paul to see what word he was asking about," so she encouraged him to spell out the word, and she would tell him what it was. According to his mother, Paul knew the names of most of the letters by the time he was four. (p. 62)

> . . . in the beginning, she would copy words from the papers John (older brother) brought home from school, and then she would ask, "What do these say?" (p. 64)
>
> . . . it was the [television] weather reports and, later, the television commercials that seemed to create his excitement about letters, spelling, writing, and then reading. She said she herself was unaware of Jack's ability to identify written words until he began reading aloud some of the advertisements on television. She said his recognition of the same words on food products in the grocery store was a source of great delight to him. (p. 120)

Söderbergh (1977) reports in detail the responses to reading materials made by her daughter, beginning at age 2 years 4 months and continuing for a year. During the first six weeks the child was presented word cards denoting familiar things and actions. After six weeks, the words of a short book were put on cards so that after learning words on cards, the child read them in a book. During this period the author observed that the child treated word cards as if they had been persons or things and that functors were difficult to learn out of context.[2] Then, at the child's instigation similarly spelled words were commented on and compared; it seems that visual images of words were formed as they were learned. The child learned about 150 words during the first three months. During the next nine months, and after learning the words, she read books that contained only the learned words, rereading them many times and relating characters and events to herself. She was able to learn five to ten new words a day and began to decode new words by herself by analysis into letters or letter clusters, noting to her mother the similarity to previously

learned words. By the eighth month she was learning 130 to 140 words a month. After one year of reading and practicing new words on cards, she was able to read almost any new word that was put on a card. Then she was given new books directly without the preliminary card reading and learning. The author noted that it was in rereading the stories aloud to herself that the child learned phrasing and intonation, practicing different intonations and stress patterns. In spite of learning words on cards, the child from the beginning connected reading and reality. New words on cards were put into context through the child's comments (e.g., "Mother, I get so frightened when it says 'frightful' on a reading card"). Contents of a story were frequently criticized if they conflicted with her knowledge of the world (e.g., "That is not what gives people grey hair. It is only when they get old," was her retort when she read that waiting turned hair grey). The contents of some stories also served as inspiration for her play and enhanced some later experiences (e.g., she was delighted to be able to label new experiences using words she had only read, such as her first view of a pasture). Writing, which had not been fostered, was initiated by the child after her first year of reading. She began to write to invented people; first using capital letters, then lowercase. She seldom made spelling errors.

The case study demonstrates how and under what circumstances the written word might be acquired. The author had predicted that if a child learns to talk without formal instruction, solely by being exposed to

language, then, if exposed to written language, a child ought to be able to learn to read at about the same time by forming hypotheses, building models, and thus discovering written language's morphemic, syntactic, and semantic systems. Here, exposing the child to written language was not haphazard but was conducted by giving the child words on cards to learn with the first words being those that were extremely familiar to the child. Later words came from books that the child would read next. The author noted that the child herself constructed notions about visual features of words, how they could be pronounced, how they were related to objects and events and how they were used in stories. She read and reread words and stories many times, just as children recite words and phrases when learning to talk.

While the report demonstrates that a very young child can learn to read, the hypothesis remains unproven that the processes of learning to read and speak are the same; while in language learning what is learned is selected by the child, in this study the words were not chosen by the child. Nonetheless, the study does support the important notion that children can learn to read without being taught rules--that they can discover the morphemic, syntactic, and semantic systems as they learn words and read stories, and that it can take place as the child is learning to talk.

Another training study conducted by MacKinnon (1959) documents first-grade children's progress in learning to read. The study contrasts three types of instruction: (a) Groups of children met with an experimenter to

read simple, repetitive sentences[3] aloud. Sentences were partly cued with pictures and that gradually included new words and a larger variety of consonants. If they could not read something, they, as a group, tried to figure out the print. The experimenter-teacher helped only when asked by the children. (b) Individual children met with an experimenter to read the sentences described above aloud. Since instruction was one-to-one, each child had to read all the sentences and had no opportunity to work together with others to figure out words. (c) Groups of children read aloud with an experimenter using standard reading materials[4] and a standard instructional format. Unlike the a groups, these children did not learn to approach reading as a problem-solving venture.

The results were quite conclusive, showing that the (a) instruction, using letter-restricted materials with groups of children, obtained the best results; the (b) instruction, with a single child/experimenter setting, was next best. Summarizing from MacKinnon's data of the second, fifth, seventh, and last sessions of the average number of errors made and not corrected (Table 1), it is evident that the advantage of letter-restricted materials was greater at the end of the 10 sessions than before them and appeared only for function words. Also, only those children reading from

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Insert Table 1 about here.

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the letter-restricted materials continued to offer suggestions to other children (see Table 2). Finally, there was a significant advantage to the grouped, letter-restricted instructed children on the Gates Reading Readiness Test and Diagnostic Tests in Reading. While these children also took longer to complete the tests, they attempted to do more of the test items. Even though they had been exposed to half as many letters and fewer words, they appeared to focus on the letters they knew, using them as cues to discriminate whole words. They also seemed to look more carefully at the order of the letters, using word parts that needed to be discriminated, to achieve a more analytic approach to reading and test responding.

Insert Table 2 about here.

A third training study followed groups of nursery school children for nine months, during which they received informal prereading instruction (Mason, 1977, 1980). At the beginning and end of a school year, the children's parents filled out a questionnaire in which they described their child's interest in learning about letters and words and any roles they played in fostering their child's reading. Word and letter identification and word learning tasks were devised to measure when and under what circumstances the children began to read and were able to remember printed words. The results indicated that all the children made progress in prereading and that four were reading on their own by the end of the school year. The changes made in knowledge of reading, and skill in recognizing letters and words, and skill in spelling and writing were best described in

terms of three levels of development.[5] The first level is denoted by an ability to read at least one printed word. At that time children begin to recognize printed signs and labels. They usually can recite the alphabet and are attempting to print letters and recognize letters in words. At the second level, they begin to read a few words from books, to print and spell short words, and sometimes to try reading new words by looking at the first consonant. At the third level children notice and begin to use the more complex letter-sound to word-sound congruences and letter pattern configurations. Thus, third-level children start using a sounding-out strategy to identify words and realize the more common vowel sound and letter-cluster-to sound regularities. They are readers.

Here are descriptions of the progress of four of the nursery school children. Their knowledge of reading which represents progress at different levels of development provides evidence that children's prereading knowledge can be differentiated.

Child E. According to parents, at the beginning of the school year E could not read any words and seldom named letters or recited the alphabet. This was borne out on the first alphabet test that we gave her in September, for she named only 2 of 10 letters. In an interview two months later, she knew 9 of 10 letters and, when given magnetic letters to use, was able to spell her first name and the word cat. When asked to write something for the experimenter, she made four letter-like shapes. Given five pictures and five word cards and asked to put the labels with the pictures, she was able, after four trials and with correction after each, to place three printed words

(baby, shoe, flower but not dog or chair) next to their pictures. She was also able to read two of the six words that she had been taught in October by her teacher. Five months later, though, she did not recognize any of the six words.

In April, we gave her a task of learning 12 words. Some words were in upper case, some in lower case, some mixed. This was called a case shift case. After four trials, with correction after each, she knew three words (TOY, RAT, RABBIT). On the fifth trial, however, we switched word cards so that every word had at least one change in letter case (for example, TOY became toy, RAT was rat, and RABBIT was rabbit). Now she could not recognize any of the words. During the spring we also gave her lists of three-letter words to try reading: She was unwilling even to guess any of the words.

Although in September she had showed little interest in prereading (parents said that she seldom asked about words or drew letters), by May they reported that she very often made letters in her drawings, very often asked for printed words to be read, and very often spelled out letters in words. In September, no one at home was teaching her, but in May she was reported to be learning letter names and printing at home and she was read to more frequently than before (from less than 1/2-hour per week to about 1 hour per week).

Child E. E moved from a non-prereader to a Level 1 prereader in nine months. By May she had learned most of the letters, could remember printed words, and according to her parents, could read cereal names and names of her school friends. Her method of learning words, however, was still ineffective as indicated by the letter-case shift test given in April.

Child D. D was a non-prereader in September but was a Level 1 prereader in May when parents reported that he recognized one word, the word stop. In the September survey, he could not order the letters

to spell his name and he tried to call letters by number names (C, T, O were called 2, 6, 12). When asked to place five words next to their pictures, by the fourth trial he was able to match two of five words with their pictures. An interview two months later indicated some letter learning (he named O and S and tried names for the other letters), an interest in reading (given a choice of toys, letters, or books, he said he would prefer a book both for himself and for a friend), but an inability to spell his name or the word cat. When asked to write something, he scribbled wavy lines.

In March, when asked to read any of 32 three-letter words from a list, he started to give number names. A month later, shown a 16-word test, he tried "cow" for bud and said nothing for the rest of the words. On the case shift test, however, he learned three words by the fourth trial (Top, truck, Boy) but on the fifth trial, when the letter cases were shifted, he could not recognize any words.

Progress in prereading was evident from D's errors. At the beginning of the school year he confused letter and number names; later, he tried number names for words. In April he had begun to attend to the initial consonant of words (three of the four words he tried to pronounce on Trial 5 of the case shift task matched the initial letter). According to parents, he changed in his use of letters (printing less than 5 letters in September to about 10 in May and recognizing less than 5 letters in September but more than 20 in May). Parents also reported that no one was teaching him at home.

Child J. In September, J put the letters for her name in the correct order, she named correctly all 10 letters that we showed her, and by the fourth trial on the word-picture task, she had matched all five words to the pictures (her score on each trial was 0, 1, 3, 5). In the interview two months later, she printed her name correctly in upper case, spelled cat correctly, named 9 of 10 letters, and

could read 1 of the 6 earlier learned words--elephant. She tried, unsuccessfully, to sound out some other words. When asked to write something she printed i C i C t L i O.

On the mid-March 32-word test, she recognized dog and tried "fan" for far and "butterfly" for bur. In April when we gave her a 16-word test, she read dog and cow and made use of the first letter on most others (e.g., bud was "bird," cup "cap," sue "slip," lug "lip," lye "yellow," and use "universe"). On the 30-word test (these were longer words, some of 2 or 3 syllables), she read 2 words correctly, Dave and ran, but did not recognize any of the 6 words learned earlier. Importantly, she gave words that matched some of the consonants in the printed words and on 14 of the 20 words, she also used the short a sound. This is notable because nearly all of the words contained an a (although not necessarily a short a). On the case shift test she knew 11 of 12 words by Trial 4, but missed 3 of those 11 on the last trial (read "tricycle" for TRUCK, "bite" for Bread, and "rab" for rabbit).

There were no changes noticed by J's parents in letter and word knowledge. At both time periods, she occasionally spelled or sounded out words and occasionally discussed TV with parents, she very often named letters and recited the alphabet without error, and she knew more than 20 letters. The parents said they were helping her learn about letters and words. Parents reported her reading stop, exit, no smoking please, cat, kitten in September, and yes, no, daddy, mom, dog, and people's names in May, thus moving from Level 1 to Level 2 in the school year.

An interesting aspect of J's report is the frequency of the short a sound in the 30-word list (e.g., snake was "sat," placed "panned," large "land," ate "at," later "lat," went "wat," and was "wast"). This suggests that she was attending not only to the initial consonant but also to the first vowel. Perhaps she was trying out a short vowel rule.

Child P. P was the only child at Level 3 (reader) in September; his parents reported him reading words such as mother, father, brother, sister, country, television, book, and telephone. Since the questionnaire was not intended to measure accurately such advanced reading behavior, the May report did not indicate much change. Parents did note that he read words that were quite abstract (such as remarks, unity, operations, continued). They also noted an increase from occasionally to very often in sounding out words and asking for a word but a decrease in discussing educational television. Throughout the year, he was read to more than two hours a week and was taught reading at home by parents.

The November interview also did not tap this child's knowledge except that he was the only child then who on request to write something printed a real word. He also correctly read the six words learned earlier and named all 10 letters. The March and April word tests showed his more advanced level of word-reading development. On the 32-word test, he made only one error ("dig" for aid) and on the 16-word test he misread car (saying "ear") and nor ("non"). On the 30-word test, he missed one word--later was read "ladder." Finally, he was not misled by the letter case change; by the second trial he correctly read all the words and made no errors later.

Three pieces of evidence suggest that P had acquired the requisite skills for recognizing most one syllable words. First, parents reported that he could read multisyllabic words, even those that reference abstract concepts. Second, test data show that he could decode unfamiliar words without contextual support. Finally, although he made four errors in reading words, such as mistaking an e for a c, an a for a d, and an r for an n, and reading aid from right to left, he made no consistent errors and his percent correct score was 94%.

A subsequent study was carried out to determine whether the three levels of development would be apparent through testing children's prereading

knowledge and, if so, whether that test would predict reading after a year of instruction (Mason & McCormick, 1979). Three classrooms of kindergarten children were tested in late spring, retested during the first week of first grade, and given a Gates-MacGinitie Primary Reading Test at the end of first grade. The children were separated into three groups based on their end-of-first-grade achievement test scores. The 6 children who at the end of kindergarten had obtained deviantly low scores were still Level 1 prereaders in first grade. The remaining 44 children were at Level 2 (38 children) or Level 3 (6 children).

Prereading test scores at the end of kindergarten and progress over the summer suggest that children were well categorized by the three leveled model (see Table 3). Children in Level 1 who did very poorly in spelling,

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Insert Table 3 about here.

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letter sounding, and word reading also had not yet learned their letters. However, they made great progress over the summer in letter naming and even in spelling--they were beginning to separate words into phonemes. Level 2 children, knowing the alphabet at the end of the school year and able to read a few words, made the greatest progress on consonant identification and the reading of two- and three-letter words. Level 3 children, having mastered the alphabet and consonant-sound correspondences, showed progress on vowel sounds and recognition of words. Thus, all the children changed over the summer, all learning more about how to read, but, in keeping with a developmental notion, learning about different aspects of reading.

Stepwise regression analyses confirmed the overall strong predictability of the prereading test. Subtest items predicted the combined Gates-MacGinitie vocabulary and comprehension scores with a multiple correlation value of .869, predicting over 75% of the variance. Two subtests predicted the variance, word reading, and consonant-sound identification. Other tasks contributed less for this sample of children because most of the children were Level 2 prereaders.

A follow-up study sought to determine whether training prereaders to recognize letters and words can accelerate development and whether letter training is a critical instructional component. To this end, 10 lessons were arranged which were thought to foster Level 1 or Level 2 development. Eight children, in groups of three or four, were taught 6 consonants and given short, very simple stories which they learned to read (or, more accurately, to recite). They also practiced printing letters, naming and drawing objects that began with the letter, and finding particular letters in words. Another group of 7 also learned to recite the stories but talked about the stories instead of receiving instruction in letter identification and printing. They also took turns extending stories and categorizing pictured objects.

While all the tasks were completed with (or without) help, there was a clear hierarchy of difficulty. Most children did not seem to understand what it meant to point, for example, to the t's in words from a story. While willing to comply, they did not understand why they were drawing pictures of objects that, for example, began with t. They continually

forgot to "draw a t to go with" their picture. Also, only two children could name words beginning with a particular consonant; the others mimicked the teacher's choices. On the other hand, the six to seven page stories,[6] which contained a handful of words on each illustrated page, did not require children to understand or remember sounds of letters. After listening to the teacher read a story, they were able in one or two readings to recite most of the text. They were eager for their turn to read aloud. Even easier were the tasks of selecting letters and naming pictures. Thus, a hierarchy of instructional difficulty was: letter recognition = picture categorization < story recitation = letter copying < letter-sound tasks. According to parental report, all the children subsequently displayed much greater interest in reading, printing, spelling, and having words identified. Five months later, the parents reported greater interest in prereading. Since the sample sizes were very small and the training very short, these results need to be interpreted with caution. Nevertheless, the results suggest that preschool teachers and parents might substantially advance young children's prereading knowledge by helping them to label pictures, to name and spell words, to print letters and words, and, perhaps most important to Level One children, to read or recite simple stories.[7]

One other longitudinal study, a diary study in beginning reading, was reported by Calfee and Piontkowski (Note 7). Fifty first graders who had not yet learned to read but whom their teacher thought would probably soon learn to read were observed and tested throughout their first year of reading instruction. While details about individual students were not

available, the growth of decoding skills was described in terms of mastery of particular skills during first grade. (The test was correlated .65 with reading achievement at the end of second grade.)

> During September and October students demonstrated functional prereading skills--they knew their letter names, could identify rhyming words, and could match the appropriate letter forms to the initial consonant in words. However, in the November test on rhyming words, differential patterns began to emerge. The differences increased during Winter and Spring, and by the end of the school year there were five discernible levels of skill mastery among the 50 students. Eleven students were able to perform successfully every decoding task in the entire system. Six students succeeded on vowel contrasts but had not yet learned to handle polysyllabic words. Eight students had some success in pronouncing consonant blends and digraphs, but could not handle vowel contrasts. Sixteen students were able to identify words that contained consonant blends and digraphs in spoken words, but were unable to read them. Nine students were still having trouble decoding CVC words. (p. 17)

The nine last mentioned students, most of whom continued to obtain low reading scores in second grade, were described further. In December, when the students were asked to read three letter words, typical responses were to give no response, to give a response unrelated to the word, or to say a word that contained one letter of the word to be read, usually the first letter. In May, initial and final consonants were almost always correctly matched. Vowels were still generally incorrectly rendered.

This description of the nine children matches very closely the growth observed in the earlier reported study of preschool children (Mason, 1980).

December responses were like Level 1 word reading behavior, being either a no-response or an unrelated word. May responses were like Level 2 behavior, that of matching the initial or initial plus final consonant. At both levels, vowels were usually wrong. Thus, the children in the Calfee and Piontkowski study who knew the least about the phonology seemed to be most like prereaders. It is also important that these children, although failing to make significant progress in decoding, did acquire some skill in reading stories orally. Possibly, these children had begun learning to reference speech to print but, lacking an adequate understanding of phonology, had not begun to figure out how to decode vowel sounds.

Results from these longitudinal studies, which by themselves are insufficient as they need to be both replicated and extended in scope and population type, help to explain some individual differences in reading achievement that appear at the beginning of first grade or before a year of reading instruction has been completed. These differences, the foregoing analysis suggests, are not due principally to the teacher or the method of reading instruction but to the differences in children's already acquired knowledge of prereading. Since it took Söderbergh's child a full year--given concerted parental help--to pass through the prereading levels and since only half the 4-year-olds Mason (1980) tested moved through one level of prereading during the nine months they were observed, it seems likely that children who are given next-to-no-help at home, therefore being unlikely to recognize printed words or letters and still less letter sounds, may be as many as three years behind their more fortunate, parent-assisted peers when they start school.

While a one to three year developmental lag sounds disastrous, it must be kept in mind that more longitudinal studies are needed to determine (a) whether recognition of words, printing, and spelling are sufficient precursers; (b) whether formal prereading instruction can affect children's later reading success; and (c) whether parents can be taught to provide relevant informal prereading instruction. If so, then we can begin to consider how to improve the prereading milieu of preschool and kindergarten children.

Cross-Sectional Research

The division of prereading into concepts related to reference, phonological awareness, and labels and rules reflects principally a speculation that there are three interrelated strands of prereading competency. One is initiated by learning how context cues help to identify object names as printed words, a second is begun by recognizing that sounds in words are related to letters and that letters have particular graphic forms and sounds and a third is based on the assumption that, as concepts about reading are acquired so are descriptors and procedures for carrying them out. These distinctions are particularly relevant to this section. Research on prereading processing will be classified accordingly, focusing on the original question, "What does a child know about reading before becoming a skillful reader?" Other research on prereading will be discussed after that and interpreted in light of the findings and explanations.

Reference

> A child was overheard asking a teacher, "How do you spell 'Mom'?" As it was spelled, the child wrote it out, studied the word, and said, "M-O-M, mommy." (Observed by Mason at a nursery school)

Bruner (1979) contends that the term reference, which means the ability (with respect to language learning) to relate speech to objects, should be studied according to the set of procedures that enable a child to label familiar objects, not merely the act itself of indicating or labeling. In likeness to speech, print/speech reference in prereading involves knowledge of how to separate speech into junctures that correspond to printed words with the purpose being to realize the relationship between one and the other. Referencing requires a child to learn about the relationships among speech, objects or events, and the printed word or phrase.

It is probably acquired in a fumbling manner, for at first the child does not realize, for example, that the printed word rabbit cannot be called "bunny" (Mason, 1980) or, as noted by Harste, Burke, and Woodward (Note 11) CREST is not read "toothpaste" or "brush your teeth."

A number of researchers have studied some aspects of children's knowledge of print/speech reference, using the terms "word consciousness" or "segmentation." Studying children's abilities to segment speech into words, Karpova in 1955 (abstracted by Slobin in 1966) described three stages of development. Three and four-year-old children regarded the sentence as composed of semantic units; words were not distinguished. For example, the sentence, "Galya and Vova went walking" was said to contain two words, "Galya went walking" and Vova went walking." At the next stage children

were able to identify object nouns or to separate sentences into subject and predicate. In the third stage, children understood the notion of wordness except that compound or multisyllable words were sometimes mismarked and functors were often not distinguished. Huttenlocher (1964) gave children two-word sequences and asked children to reverse the order of the units. She found that 35% of the four and five year old children could not do the task. Those who could had the most trouble reversing common phrases (e.g., when asked to say, "runs man," after presentation of "man runs"). Holden and MacGinitie (1972) simplified Karpova's task of sequencing sentences by asking children to point to a poker chip as they repeated each separate word in sentences that they had just heard. Testing 4 to 6 year olds, they found that most of the children were in Karpova's second or third stage.

Ehri (1975) extended the Holden and MacGinitie study by testing whether sentence segmentation performance would be improved if sentences were read in a monotone with a demonstration of the correct division into words. Preschool children improved little, changing from 17% when performing under normal conditions to 22% with the monotonic demonstration. Kindergarten children who could not read benefited considerably, obtaining first an average score of 20%, then a score of 43%; however, kindergarteners and first graders who could read made little improvement, changing from 58% to 59%. One possible explanation for the low scores is that children may have been confused by an accompanying syllable-sequencing task.

Another possibility is that the task quite accurately reflects children's understanding of the relationship between print and speech (after all, readers performed better than did prereaders) but that mimicry is not sufficient to affect conceptual knowledge. Further, while children who could read obtained the higher scores, their overall scores of less than 60% suggest that even beginning readers do not have a complete understanding of print/speech referencing. This interpretation is in agreement with work completed by Holden and MacGinitie (1972), Meltzer and Herse (1969), and Mickish (1974).

One possible effect of a lack of understanding of print/speech reference could be used to explain results obtained by Francis (1977). Five-year-old children who had begun to read, all of whom could read some or all the words in a book, were asked to read (a) the exact sentences from the book, (b) unfamiliar but meaningful sentences comprised of words from the original sentences, and (c) a listing of the words from the sentences. Combining children's scores from two social classes and three ability levels reveals that the number of word errors was higher for unfamiliar sentences (30%) and words in lists (32%) than for familiar sentences (20%). Differences were particularly marked for low ability children. The results suggest that first graders learn words in a particular context; they do not necessarily transfer word/print information to other contexts. Perhaps they are still treating sentences as an unbroken stream rather than in terms of individual words. That is,

it is possible that at this lower level of development, words are not the child's unit of analysis but are treated in terms of the meaning or message.[8] Children's errors support this interpretation as they often rendered unfamiliar sentences as the sentences originally learned. A similar result was obtained by MacKinnon (1959).

It is plausible that when children who lack sufficient understanding of reference try to read stories, they relate print to speech in terms of units that are larger than the word; if so, they will not initially gain from textbooks that contain a large number of the same words.[9] If they do not have a sufficient grasp of reference to notice that word units are repeated in sentences, they may attempt to read by recognizing units that are more clearly junctured in speech and print--meaning-bound phrases and sentence-sized units. Having learned to recognize and recite those, they could miss the repetition of printed words. If so, telling some children to use context clues to figure out a new or a forgotten word may be pointless or even misleading. A child may as well be reading words in a list as reading an unfamiliar sentence--a result which is nicely documented in the Francis study.

The research that was just presented is concerned principally with developmental change and individual differences. To return to Bruner's recommendation that <u>reference</u> be studied from the standpoint of sets of procedures, we need to ask what could be guiding change, that is, what could be the procedures that the child uses to learn about reference? The question is speculative, there being no concerted research on the topic. However,

results from the earlier presented longitudinal research suggest what the child does to acquire this knowledge.

We observe firstly that parents frequently report that their child began reading by watching television advertisements closely, noticing words on food product containers, or attending to traffic signs. Consider that each of these provides occasions of nearly direct matching between speech and print. For example, a television announcer describes a product, emphasizing its name, and the name or a picture of the labeled product is prominently displayed. Young children grocery shopping with a parent hear products named and see what is selected, often even helping to choose a particular product. In these informal ways, children begin to notice that print is used to express or label objects named. Television commercials, food and household products, store and traffic signs, and billboards are aimed to attract attention to print as a reference to objects or (in the case of traffic signs) actions. These obviously provide some of the necessary knowledge about speech junctures (and suggest that the advent of television helps to explain children's higher first grade reading scores found by Barth and Swiss, 1976 and by Scott, 1975).

Even while children may not be coached by their parents to begin reading, many are helped to recognize labels on food products or signs. Thus, they are likely to acquire some notions about how speech can be coded. Note, however, that in these instances print is highly contextualized, words often appear embedded in a picture or design, and the meaning referencing the printed word may not be voiced in the same way each time.

While STOP occurs next to a crossroad on an octagonally shaped board and has no accompanying pictures, food labels are likely to be more difficult to discern and could be referenced in various ways by parents (e.g., brand names, generic names, subtopic labels). Also, some two- or three-word phrases are always together: (e.g., Corn Flakes, Captain Crunch, Coca Cola), so children may not realize the importance of spaces to identify separate words. As a result, while the child can begin to learn how objects and speech are related, incorrect deductions about reading can also easily be made.

The segmentation research is suggestive about what young children know about print/speech reference and how they change in their understanding. The longitudinal data indicate that reference is an early step taken by the child to begin acquiring knowledge about reading. Yet we know little about how parents help children to acquire an understanding of how speech is junctured to form print. The segmentation research shows that a great change in understanding occurs in first grade. It appears that even after repeated experiences of being read to and coached on word recognition by parents, children will usually enter school with an inadequate understanding of reference. Not only are word junctures poorly understood, but object noun words may be inaccurately related to speech (or freely translated, as noted above) and function words may be entirely unrealized. Differences found between preschool children's ability to learn to read words that vary in meaningfulness, such as nouns

versus function words (e.g., MacKinnon, 1959; Mason, 1977; Ollila & Chamberlain, 1979; Steinberg & Yamada, 1978), support this interpretation.

An instructional implication is that beginning reading instructors ought to be well aware of the conceptual problem young children face when confronted by whole sentences, many of which are written in a style that poorly match children's speech utterances.[10] It may be very difficult for many children to figure out how printed phrases and sentences are related to meaningful speech. This is perhaps the point of "reading for meaning," stressed by Goodman (1972a, 1972b), and Smith (1973).

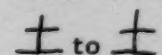
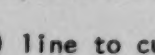
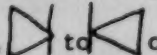
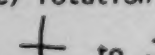
Phonological Awareness

> It was my very own child who first embroiled me in the nettlesome issue of "metalinguistic knowledge." At about 3½ she asked me: "Mom, is it an a-dult or a nuh-dult?" (Gleitman, Note 3, p. 1)

According to Halliday (1975), there are two functions of speech: pragmatic (interactive and manipulative aspects) and mathetic (declarative and observational utterances that lead the speaker to become aware of language itself).[11] It is the latter which has been tied to "phonological awareness" and when indicating reading, describes knowledge of the phonological and orthographic structures of a language. While phonological awareness extends beyond the prereading period into later development of reading knowledge (as does reference), we shall necessarily center on its inception. As such, whether or not the rules for letter-to-sound relationships can be verbalized is not the issue here; instead, it is what the child appears to understand and utilize when confronted with printed

words and how that understanding leads to changes about how print is noticed, recognized, and remembered and how it is interpreted. Two aspects of the initial development of phonological awareness will be considered here: (a) differentiation of the graphic forms of letters and (b) phonemic analysis of words. These will be discussed in turn.

Letter identification. When a child is able to name or print letters, considerable knowledge has been acquired of the critical attributes for distinguishing letters. A child then knows that particular strokes and orientations of straight and curved lines, not thickness or color of lines, are to be noticed, that letters can appear in various type fonts, and that some letters have more than one form (e.g., Aa, Ee, Rr). What may be more remarkable is that this information is seldom taught directly, yet it must be known--letters must be recognized accurately--in order to learn to read. What then is known about children's acquisition of letters?

Letter knowledge has been tested principally with three types of tasks: letter or symbol discrimination, letter recognition, and letter naming. A discrimination task measures the child's ability to match pairs of symbols. Gibson, Gibson, Pick, and Osser (1962) tested children aged 4 to 8 on discrimination of novel letter-like forms (e.g.,) by comparing each with 12 transformations. The child was asked to select exact copies of the standard form. Four types of transformations were compared across age: (a) break and close (e.g., ), (b) line to curve (e.g., ), (c) rotation or reversal (e.g., ) and (d) perspective ().

Break and close transformations were least frequently chosen; errors decreased over the age span from 15% to 5%. Line to curves were reduced from 38% to 7%, rotations and reversals went from 46% to 4%, and perspectives changed from 79% to 60%. The differences in the four types of transformations demonstrate what young children observe about print before learning to read and how they alter their perceptions, presumably in response to learning to read. Break and close transformations are infrequently chosen as copies, even by 4-year-olds, while rotations, reversals, and line to curve transformations are not initially recognized[12] but by age eight are rejected as often as are break and close transformations. However, perspective changes continue to be accepted as exact copies more than half the time. Foreshortening or tilting of a letter, unless excessive, are usually tolerated, as they would be by skilled readers. The study indicates, then, that over the time period that young children are learning to read, they gradually learn which features of symbols are critical in recognition of letters. They learn to discriminate features that distinguish different letters and ignore features that do not.

Hillerich (1966) cites an unpublished study by Nicholson in which 2,188 first graders were tested after three weeks of school. Results of a letter discrimination test, with mean scores of 25.34 in matching capital letters and 24.48 in matching lower case letters, suggesting to her that gross discrimination reading readiness activities are a waste of children's time. This conclusion is not generally disputed. The value of letter

naming, by contrast, has not been settled. Olson (1958), who followed 1,172 of the children Nicholson had tested through the middle of second grade, determined that the mean for lower-case letter naming was much lower at the beginning of first grade (9.0) and that letter naming correlated .55 with second-grade reading. Similarly, de Hirsch, Jansky, and Langford (1966) found that of 19 tests given in kindergarten, letter naming was the best predictor of second grade reading (.55). This high correlation has also been confirmed by many others (see reviews by Barrett, 1965 or Chall, 1967). However, according to Venezky (1978), "a significant advantage in letter name training over other forms of initial training for benefiting first grade achievement [has not been realized]" (p. 12). Gibson and Levin (1975) suggested that "untaught knowledge (or reasonably spontaneous learning) of the names of letters is simply a symptom of a child's awareness of linguistic concepts or of his interest in language and reading, and not in itself something to build on" (p. 251). Venezky (Note 9) thought that "letter-name knowledge at the beginning of first grade reflects the presence of a variety of factors which themselves are important for learning to read; e.g., level of cognitive development, emotional stability, attention span, and proper interaction with adults outside of school" (p. 10). A third alternative is that letter names orient the child to analysis of words, and serve as partial labels for identifying phonemes in words and for relating letter symbols to their sounds.

The longitudinal studies described earlier provide evidence that letter naming is closely tied with the initial development of phonological awareness. Upper-middle class children (Mason, 1980) learned to recite the alphabet, then began learning letter names, and to print letters at about the same time that they started to recognize printed words in context. Kindergarten children's letter naming scores (Mason & McCormick, 1979) were correlated .56 with end of first grade reading achievement. Further, as Table 3 shows, while most of these children knew their letters, those who did not knew little else about reading. Yet, because even the low performers improved during the summer in their knowledge of letter names, a reasonable conclusion is that they were now beginning to acquire some prerequisites to reading, later than most of the other children but making progress nonetheless.

If letter naming is important to reading, why have training experiments not been able to demonstrate its value? Two possible explanations, which overlap, are indicated. First, to return to the point made at the beginning of this section, letter naming is a task which measures more than knowledge of one form of each letter; it approximates underlying conceptual knowledge of letters. So, children could have been taught to label differently C, O, G, and Q or b, d, p, q, and a but it might have been carried out without communicating to the child the distinctive visual features of the alaphabet. Samuels (1973) showed that letter name learning was facilitated by visual discrimination training on distinctive features of letters. Thus,

some experimenters may have used a single type font or letter case in their training and testing, and then falsely concluded that the trained children had acquired the concept of how to differentiate letters. When eventually tested in another setting or with slightly different materials, the children might have failed to see the connection. Thus, there are a number of pitfalls to attaining a conceptual knowledge of letters. The letter name experiments probably failed because training was too narrowly defined.

The second explanation is that letter naming may provide an important function as a verbal label, both to help children differentiate letter forms visually and to aid them in identifying or remembering sounds of letters. Verbal labeling was found in paired associate work to aid preschool children's learning (Spiker, 1963). With respect to its value in affixing sounds, the principal opposing argument comes from Venezky (1978, Note 9). He states that letter name training cannot be justified on grounds of mediation for sounds: "40% of the letter names are not usable as sound mediators (letters such as h or w do not name the sound, also vowels, c and g name the less frequently appearing sound) and the remaining 60% must be differentiated according to where the mediated sounds occurs" (i.e., at the beginning or end of the name). However, an alternative analysis of letter names allows the opposite conclusion. Children's attempts to read and spell words (Chomsky, 1971, 1977; Mason, 1980; Mason & McCormick, 1979; Paul, 1976; Read, 1971) show that children

learn letter names somewhat before they began to relate the sound of consonants to words. This suggests that when uninstructed children begin to recognize and analyze words into letters, consonant names may serve a sound mediation role. If we consider the usefulness of consonant names, a different conclusion is warranted: While two consonants (h and w) do not describe a sound that the letter makes and three others (y, c, and g) are misleading,[13] describing less frequently used sounds, there are still 16, or 76%, of the consonants which contain in their names the principal sound. The fact that the sound is either displayed at the beginning (e.g., b, d) or the end (e.g., f, l) of the letter name is not necessarily a serious impediment. The research to date has not found differences in effects of initial-name and final-name consonants.

Letter naming, then, could be described as a mask for a more enveloping concept about print. If so, cursory letter-name training will not by itself make a difference in reading. In learning letters at home children learn to differentiate letters, recognize their various upper-and lower-case forms, and label those forms. Since they generally learn letter names because parents present the names rather than sounds, names become children's first means of differentiating and labeling letter forms; later these labels may help to mediate between the grapheme and the phoneme. The latter point, while attested to by Durrell and Murphy (1978) and suggested by children's word reading errors (Mason, 1980), needs to be researched in more depth.

Another aspect of letter identification is seen in letter writing. According to Gibson and Levin (1975), previous studies of writing indicate that children's early productions can be classified into levels of development (Hildreth, 1936). Children between the ages of 3 and 6 were asked to write their names or any letters or numbers they could make. Five levels were observed: (a) unorganized aimless scribbling; (b) up and down zig-zags; (c) contrasts of straight lines and curves; (d) close approximations to real letters and words; and (e) construction of real letters or words. Since none of the children had been encouraged by parents to write, it was concluded that writing skill develops without direct instruction. Wheeler (1971) analyzed kindergarten children's drawings and writings, dividing the school year into 15 ten-day periods in order to study more closely the development of writing. A change over time from designs and pictures to letters and words in isolation to words in phrases and sentences occurred. Construction of letters improved, apparently by self-correction, since the teachers did not intervene to correct errors or to teach children how to write.

Some research has found a positive relationship between parents' perceptions of preschool children's prereading knowledge and tests of the children's letter and word printing ability. Mason (1980) found that preschoolers began to write at about the same time that they began to recognize printed words. Thus, writing (actually printing letters and

words, usually in upper case) seems frequently to accompany preschoolers' increasing interest in naming letters and reading words. It appears frequently to be a self-motivated activity, requiring little or no correction by adults. While it is not an easy task for some four-year-olds, it is often highly valued by children themselves. What we do not know yet is what role parents play in encouraging their children to write. Durkin (1966) reported important differences in home interviews between parents of early readers and nonearly readers. For example, between 47 and 83% of parents of early readers said that paper, pencil, blackboards and reading materials were available while only between 14 and 23% of parents of nonearly readers provided these supports. Thus, since many preschool children begin to write as they acquire prereading knowledge about letters and words, the role writing plays in acquiring prereading concepts might be more important than we yet realize (see work by Calkins, 1980; Graves, Note 12).

Phonemic analysis of words. In order to utilize an alphabetic language properly--by which it is meant taking advantage of the structure implicit in an alphabetic code and thereby learning to read words never before seen in print--what must a prereader understand? In some way unknown to us as yet, the child must work analytically to distinguish sounds in words and relate those to letters. However, phones, which are the separate speech sounds, are not necessarily represented in the orthography. Instead, collections of phones which are regarded as the same by speakers of the language are distinguished. These are called phonemes. Phonemes, then,

are more or less well represented by the graphemes, our alphabet. In the case of English the representation is complex since we distinguish more phonemes (about 40) than letters (26). To further confuse the child, some phonemes (e.g., /k/ as in kill and call) are represented by two graphemes while some letters (e.g., c as in candy and cindy) have very different sounds.[14] Finally, in seeming disregard of the child's need for labels that might help match letters to sounds, alphabet names, as noted earlier, do not always describe a letter's principal phoneme.

Given the importance of understanding the phonological structure, how do children learn to attach sounds to letters and match those to sounds in words? Gibson and Levin (1975) offer three possibilities: (a) by induction, (b) by being told a verbalization of a rule, or (c) by practice with contrasting patterns. The question, however, is complicated by the fact that the phonological and orthographic rule systems have not been completely defined by linguists. It is even difficult to estimate how many rules there are in English for describing correspondences (see Venezky, 1970, for one classification). There is controversy over whether English orthography is related primarily to phonemes or to larger lexical units (morphemes and words). Finally there is very little evidence, in the case where children learn primarily by induction, about which structures they understand first or how; or, in the case where children learn primarily by being given rules or contrasting patterns, how much deliberate instruction is required, and how it should be ordered.

Although there is no doubt that phonological awareness is aided by formal reading instruction, the orientation of this paper is toward learning that occurs during the preschool period. Since few children are given deliberate instruction at that time, we will consider evidence that indicates inductive learning.

Earlier, two levels of prereading development were proposed and related to the three prerequisites, reference, phonological awareness, and rules and labels. Possibly, as children begin to segment object names from speech and recognize them in print (Level 1), they become interested in letters. This paves the way for further analyses--segmenting words into phonemes by making use of their knowledge of letters (Level 2). If children have learned letter names but not sounds (which among preschoolers is typical), they are likely to make use of names to segment words into letter-corresponding phonemes. This may be the way that uninstructed children begin to acquire knowledge of the phonology. Evidence comes from phonetic segmentation research, invented spellings, and word pronunciation errors.

The segmentation research seems to indicate that children understand phonetic segmentation (separation of words into sounds that can be represented by letters) as a result of reading instruction. Bruce (1964) gave children age 5 to 7½ common words to segment. They were to

report what word remained when an initial, medial, or final sound was deleted (e.g., h from hill, s from nest, or d from card). Children below age 7 had great difficulty with the task, particularly segmentation of the medial sound. Similarly, Rosner and Simon (1971) asked children age 5 to 11 to delete one sound (syllable or consonant in initial, medial, or final position) from a pronounced word. The greatest grade-to-grade difference occurred between kindergarten and first grade. Since the test was given at the end of the school year, the results suggest that first grade reading instruction facilitated performance. However, a simpler version of phonetic awareness was devised by Calfee (1977). Kindergarten children trained to recognize an ending sound as a picture (e.g., pictures of "eyes," "eat," and "ache") were able to select the picture that contained the respective ending sound, such as choosing "eyes" if given the word spies. Even when new "picto-sounds" were introduced, the children were able to carry out the task (though the average correct response was then reduced from 90 to 70%).

Phonetic segmentation was also investigated by Liberman, Shankweiler, Fischer, and Carter (1974), who asked preschool children to tap on a table the number of segments they heard in a word. They were asked, after practicing the task, to segment 42 words into syllables or into

phonemes. No word was longer than three syllables for the one condition or three phonemes for the other. The results showed that syllable segmentation was easier than phonetic segmentation. None of the nursery school children could correctly segment as few as six consecutive words by phoneme, whereas nearly half could segment that number by syllable. Only 17% of the kindergarten children but 70% of the first graders succeeded in phoneme segmentation while in syllable segmentation the percentages were 48 and 90, respectively.

The last two mentioned studies indicate that while preschool children as a whole do not perform well on phonetic segmentation tasks, some can segment by phonemes and many more can separate words into syllables or can distinguish ending sounds, implying that preschool children acquire some knowledge of the phonology by induction. The leap in performance after receiving reading instruction probably indicates that there is a fairly substantial connection between phonetic segmentation ability and instruction in reading. Nevertheless, since the relative success of a preschool or kindergarten child in a phonetic segmentation task strongly predicts later achievement in reading (e.g., Calfee, Chapman, & Venezky, 1972; Calfee, Lindamood, & Lindamood, 1973; Fox & Routh, 1976; Liberman, Shankweiler, Liberman, Fowler, & Fischer, 1977), it is clear that preschoolers' understanding of the phonology aids them in their later reading.

An explanation of the role played by phonological awareness can be extrapolated from a comparison of good and poor readers' use of phonetic recoding. In a study reported by Liberman, Shankweiler, Liberman, Fowler, and Fischer (1977), 46 second grade children with similar IQ scores but dissimilar reading grade equivalent scores were presented five-letter unpronounceable strings; in one condition they were asked to recall them immediately and in another condition to recall them after a 15 second delay. The letter strings were either confusable (i.e., rhyming, drawn from the set B C D G P T V Z) or nonconfusable (i.e., nonrhyming, drawn from the set H K L Q R S W Y). While the superior readers (second graders with an average grade equivalent score of 4.9) made fewer errors altogether, the more interesting result is that confusable letter strings more severely hampered the superior readers than it did the marginal readers (with a grade equivalent score of 2.5) or the poor readers (grade equivalent score of 2.0), particularly in the delayed recall condition. The result suggests that superior readers make more efficient use of phonetic recoding than do marginal or poor readers. This works to their advantage ordinarily but not in a task where they must recall letters that rhyme. By contrast, marginal and poor readers may be using nonphonetic memory strategies and so are not appreciably hampered by the rhyming set of letters.

This interpretation is corroborated in the Calfee and Piontkowski (Note 7) study where children were tested near the beginning of their first year of reading instruction and followed into the second grade. The correlation between overall performance on the first grade decoding tests and reading comprehension at the end of second grade was .65, and between a second grade decoding test and comprehension the correlation was .86. Children who had difficulty segmenting the most basic syllable (consonant-vowel-consonant) for the most part continued to be poor readers at the end of second grade. Furthermore, there were six children who were not instructed in phonetic segmentation or letter-sound correspondences. In second grade they still could not decode, and most of them obtained low comprehension scores.[15] Also, in the second grade testing, five of these six children, the authors report, seemed to rely primarily on meaning to read paragraphs orally. Lacking sufficient knowledge of the phonology, these children had apparently substituted other sorts of word recognition strategies.[16]

More direct evidence that linguistic awareness is often initiated by preschool children comes from studies of invented spelling. When Read (1971) showed that some preschool children were able to spell words (i.e., they invented spellings that could be interpreted on the basis of linguistic analysis), the response initially was that this behavior is atypical; e.g., "It seems to the writers that this is a rather unusual accomplishment and that these were not run-of-the-mill children" (Gibson

& Levin, 1975, p. 253). It has since been found to be not so unusual (see Chomsky, 1977; Mason & McCormick, 1979; Paul, 1976; Söderbergh, 1977; Lamb, Note 10) and provides further evidence that young children acquire some phonological principles by induction.

Read (1971) analyzed 20 children's attempts to spell common and uncommon, short and long words. He found that the children seemed to rely on letter names, for they often encoded the initial consonant and front (long) vowels correctly (e.g., day was DA, lady LADE, feel FEL and my MI). They invented spellings for sounds that were not easily identified by letter names (e.g., chicken and track were begun with h--HCICN and HCRAK--perhaps because the sound of the letter name h can be heard in the initial part of those words). These attempts to spell, when parents had given no instruction in letter sounds or how to spell, suggest that the children applied their knowledge of letter names. They probably knew that printed words contain letters and so then figured out how sounds in words might be segmented based on information contained in letter names.

Paul (1976), who taught kindergarten children and gave them many opportunities to write, noted four stages of spelling development which fit with Read's interpretation: (a) recognition of words by their initial sound and letter (e.g., TB for toy box), (b) recognition of initial and final sounds (consonants and some front vowels; e.g., WZ for was or BOT for boat), (c) using vowels to mark a place for vowels (e.g., DORRDY WOTAR for dirty water), (d) acknowledgement of the correct spelling of sight

words. By this classification, most of Read's subjects were at the second stage of development.

In the Mason and McCormick study, middle class[17] kindergarten children were given 10 magnetic upper case letters and asked to spell cat, top, at, and pot. Forty-one children spelled the four words correctly while only two children gave letter-unrelated responses. The remaining children used the correct initial phoneme (although 5 used k for c in cat and 4 sometimes inverted the consonants); half also chose the correct final phoneme of the word, but very few children who made errors used the correct medial vowel. Correlations with other reading task variables were all significant: .60 with letter naming, .58 with word recognition, .77 with consonant-sound matching, and .52 with vowel-sound matching. The correlation with reading achievement given the following year was .67 for vocabulary and .50 for comprehension. These results indicate that spelling of two-and three-letter words is very closely tied to letter recognition skills and hence to beginning reading achievement.

Labels and Rules

> Ian failed to sort out his confusions about print through the whole of his first year at school. He claimed that his teacher who wrote his name as "Ian" could not spell it; it should be written 'IAN.' But in a bookshop he pointed to the title of a scrapbook, "GIANT," and said, 'There's my name,' unconcerned by the presence of extra letters. (Clay, 1972, p. 59).

It is patently obvious that children begin learning about reading with very fuzzy definitions about reading terms, how words are read, and what to say about print. Since it is altogether too easy for teachers to use language that might be misinterpreted by beginning readers and to use tasks and procedures that are unclear to children, researchers have studied children's knowledge of reading terms and their ability to carry out directives.

An extensive study was conducted by Hardy, Stennett, and Smythe (1974). Sixty children from three socioeconomic levels were tested in October, February, and June of their kindergarten year. They were asked about their knowledge of reading terminology and some skills. The data are reported in terms of the percent of children who achieved a mastery score of 90% or better on a subtest or term. With regard to skills, they found that while alphabet recitation advanced from 44% to 75% mastery between October and June, letter naming changed from 38% to 56%, and an ability to rhyme went from 13% to 62%. All of the children were instructed on these concepts during the school year. With regard to reading terms, children were asked to show the examiner parts of a book or items in a book (e.g., front, cover, back, letter, word). The children were very competent at the beginning of the year on most of these items, above 80% on book parts, and 77% on identification of a letter, but 46% on identification of a word. By June, and after all had received instruction on the terms, they were at 76% mastery on words and 93% on the others. Directional terms were also asked. Only about 30% of the children

in October knew the right and left side of a page, but about 65% could identify top, bottom, and across. By the end of the year, another 15% knew these terms. Action terms were, for the most part, understood by the children in October. They were asked to put something on top of, over, beside, above, below, between, under, or to make a circle around or through, make a box around, or to underline. Except for under (56%) and underline (51%), mastery in October was at 70% to 95%. In June, percentages were generally in the 90's, except for through (72%), box around (71%), and underline (83%). These terms, however, were not taught to all children. They were also asked to find the middle, last, first, end, and beginning of words. Mastery in October ranged from 61% to 87% for all but beginning (54%). In June, the range was 8% to 36% higher (88% to 95%). Lastly, in October children scored in the middle range when asked to point out a big word (74%), a long word (69%), a little word (57%), and a short word (57%). In June, mastery was at or above 90% for all the length terms except short (62%). All of these terms had been taught to the children.

Clay (1972) reports somewhat lower changes over the first year of instruction: locating one letter advanced from 34% to 53%, locating one word went from 22% to 47%, and locating the first letter changed from 28% to 41%.

Downing and Oliver (1973) asked children aged 5, 6, and 7 to say "yes" when they heard a single word. They were presented with

abstract sounds, real-life sounds, isolated phonemes and syllables, phrases, sentences, and long and short words. None of the children correctly said that syllables were not words; only one 7-year-old identified phonemes as not being words. However, about half of the 5-year-olds correctly realized that short and long words were words and phrases, and real-life sounds were not. They made more errors on sentences and abstract sounds. Most of the older children knew that short words were words, but inexplicably, they did no better than the 5-year-olds on long words and phrases. They made fewer errors, however, on abstract and real life sounds and syllables.

Meltzer and Herse (1969) had first graders count, cut, and circle words in sentences. Errors were made by 26 of the 39 children. The number of errors was related to the reading level of the child. The children in the lowest reading level (28% of the children) made 73% of the errors.

This research, then, shows that we should not necessarily expect young children to know the terminology or the procedures we use to teach reading. While much of it is learned easily through instruction, some important terms (e.g., word, syllable, right, left, beginning), are not understood by many children even after a year of instruction.

A related aspect of the research on reading terminology concerns children's judgments about when a word is a word. In an earlier study, Rosinski and Wheeler (1972) found that not until the end of first grade

are children able to say that letter strings such as tup, dink, or blasps, are more like words than are nda, xogl, or ikiskr. More recently, Pick, Unze, Brownell, Drozdal, and Hopmann (1978) showed young children from 3 to 8 years of age, letter strings and asked them whether each was a word. Since the youngest children more often answered "yes" than "no" to words or nonwords, only their falsely recognized nonwords are interpretable (see Table 4). These indicate that false recognition of nonwords as words extends even into first grade. Preschool children do not yet realize very basic orthographic rules (such as, that a word must contain at least one vowel). They are, however, very suspicious of one-letter units, while much more accepting of longer pronounceable strings of letters.

Insert Table 4 about here.

Another aspect of this research describes what preschoolers attend to when asked to look at or learn words. In a study conducted in 1923 by Gates and Boeker, no systematic method of learning words was discerned. Kindergarten children were given 48 nouns to learn, 6 each from lengths of 3 through 10 letters. Since the words were not similar except in their length, they found greater variation in word learning within length than across it, and no systematic type of error. When the authors asked the children later how they had learned the words, only idiosyncratic cues were noted. Of the 60 children, for example, 6 remembered pig by the dot over the i, 4 remembered box by the "funny cross." 3

remembered window because the beginning was like the end, and 2 noticed that monkey had a tail at the end.[18]

Marchbanks and Levin (1965) inquired how cues about words are noticed by nonreaders and beginning readers. Children were shown a word on a card, then, after the card was withdrawn, they picked out a word that was most like the one seen. Alternatives included a word that began or ended with the same letters or had the same pattern of ascenders and descenders (thus, being similar in shape). The children were most likely to choose first or last letters; the least used cue was word shape. In a follow-up study, Williams, Blumberg, and Williams (1970) questioned whether the Marchbanks and Levin task would produce similar results with socioeconomically disadvantaged urban children. They found that while kindergarten children used no single cue, first grade children matched most often on the first letter and next most often on the last letter. With a different type of task (Pick, Unze, Brownell, Drozdal, & Hopmann 1978), testing first, third, and fifth graders, children were asked to judge the pair that was "most alike" from two pairs of three letter words. In every case, one pair had the same initial consonant and medial vowel (e.g., bum, bug) while the other had the same medial vowel and final consonant (e.g., hop, pop). The procedure was carried out first by having children choose one pair after reading the word pairs from cards, and later by having them listen to the words. First-graders based more of their judgments on the beginnings of words that they read than did

older children. Also, first graders gave more judgments of word ending similarity when they heard them than when they read them.

In a second experiment, Pick and associates taught kindergarten children (who were not yet reading, but knew some letters and sounds) 12 CVC words (e.g., bum. bug). Then the children were asked to try reading 18 new CVC words, six of which had the same initial CV, six having the same ending VC, and six having no letter clusters that matched. All contained letters that had appeared in the trained words. Children read more CV-matched words (27 on the first try) than VC words (14 on the first try), or cluster-unmatched words (9 on the first try). Also, errors were more likely to appear at the end than at the beginning of the word. The results suggest that when words taught together contain discernable letter-cluster to sound patterns, the initial clusters might be observed by (Level 2) prereaders and utilized to try to read new words.

These studies suggest that young children may not recognize words by noticing an overall gestalt, i.e., word shape. However, we do not know whether these children were Level 2 or Level 1 prereaders. Also, as Söderbergh (1977) noted in her diary report, a child's first attempt at word learning can be to relate words to the object or event they describe, then to relate them to other learned words. Words that are the most difficult to learn at first are those which contain no meaningful mnemonic. They either have no intrinsic meaning or are so different from other words being learned at the same time that they cannot be related by letter pattern configuration or phonemic pattern. Which

interpretation is correct is important and needs to be studied for there are overwhelming implications here for beginning reading instruction.

Prereading Instruction

Portion of prereading lesson (Mason & Au, Note 13)

Teacher: Let's all make an m, just like at the top of your paper.

JE: I'm goin' to make both M's.

Teacher: Both M's. Very nice. Very good.

TO: I can't make M's.

JE: I made a M, a small m.

Teacher: Very nice.

KR: I can't make one.

JE: I'm goin' to make a picture of mud.

The lack of a strong theoretical model of prereading has meant not only that concepts describing notions about the field have been buffetted by shifting definitions but also that the question of instruction is not resolved. First we must address the question of whether any instruction is justified and, if so, to consider whether the three strands of prereading (reference, phonological awareness, and rules and terms) provide a sufficient construct for instructional planning and decision-making.

Questioning prereading instruction. There are two principal arguments against preschool instruction. One is that young children need to learn by playing, rather than through guided instruction and the other is that a child must mature before being instructed. The first will be evaded here by asserting that children can be given prereading experiences in a play-like atmosphere. The second argument, however, needs to be discussed.

Claims that a certain level of "mental readiness" or maturation is necessary for successful reading were first espoused by Patrick.

> It is a well-known fact that a child's powers, whether physical or mental, ripen in a certain rather definite order. There is, for instance, a certain time in the life of the infant when the motor mechanism of the legs ripens, before which the child cannot be taught to walk, while after that time he cannot be kept from walking. Again, at the age of seven, there is a mental readiness for some things and an unreadiness for others. (Patrick, 1899, cited by Coltheart, 1979, p. 3).

While lacking empirical justification, this view has continued to be accepted by some. For example, "We have a mountain of evidence to prove that a perfectly 'normal' child--IQ 100--cannot learn to read until he is about six years six months old." (Hefferman, 1960, cited by Coltheart, 1979, p. 9). Arguments for the notion of maturational readiness, according to Coltheart, result from two studies: Morphett and Washburne (1931), and Dolch and Bloomster (1937). Morphett and Washburne found that children with a mental age of 6.5 or above obtained reading scores at or above a certain value. Disregarding the arbitrariness of the value they chose, they concluded that children with lower mental ages could have obtained higher reading scores if their instruction had been delayed until the critical mental age had been reached. Dolch and Bloomster, obtaining correlations of .41 to .52 between mental age and performance on a phonics test, and noting that children with mental ages below 7.0 made only chance scores, concluded too hastily that "A mental age of seven years seems to be the lowest at which a child can be expected to use phonics." (cited by Coltheart, p. 11). While research that explained the errors of these

conclusions has since been published (e.g., Bliesmer, 1954; Chall, Roswell, & Blumenthal, 1963; Davidson, 1931) and the notion of physical readiness upon which the original notion depended was discarded, reading readiness is still widely accepted. What is the attraction to the idea of maturation? One is that it provides an easy explanation for instructional failure. However, Hall, Salvi, Segger, and Caldwell (1970) offer a counter for that argument: "When a task proves too difficult for a group of subjects [a more plausible solution] is to continue searching for other possible training conditions rather than using labels (such as maturation) as explanations" (p. 427).

It would seem from comparing the predictors of second grade reading from tests given by de Hirsch, Jansky, & Langford (1966) that emotional maturity plays an important role in beginning reading because correlations of .43 to .46 were obtained using measures of hyperactivity, distractibility, ego strength (a clinical evaluation of "grit" and energy, and a goal-directed attitude). The emotional maturity measure has dubious value, though, when we learn that the scores were based on judgments made by the experimenters while conducting the other 16 tests. Since all the tests correlated positively with reading, children's interest in the task, willingness to keep trying and remain attentive would naturally be related to success on the task.

Clay (1972), who studied one group of children for a year and another for six months, argued that "to relax and wait for 'maturation' when there are many concepts and skills to be developed would appear to be deliberately

retarding the child in relation to what is usual in his culture" (p. 6). This conclusion was based in part on a follow-up study of 100 children two and three years after school entry. "Where a child stood in relation to his age-mates at the end of his first year at school was roughly where one could expect to find him at 7.0 or 8.0" (p. 7).

Thus, the notion that children will eventually read if they are allowed a longer time to mature, may actually be harmful. Children who acquire appreciable knowledge about the act of reading at home through experience in learning letters, writing, reading labels, and memorizing stories may be more experienced in prereading, not more mature. Thus, children who are not so advantaged should not be left to drift into non-reading activities when their classmates are extending their knowledge of reading. Since children who are behind at the beginning of first grade often continue to be poor readers later, "catching up" may be a myth. Hence, a more effective course of action may be to provide more prereading experiences to children in preschool programs and in kindergartens, especially to those children who demonstrate little or no knowledge about prereading and related concepts and skills.

Instructional components. As recently as the 1960's, visual discrimination was assumed to play a major role in reading instruction and achievement, as evidenced by the fact that, according to Barrett (1965), all available reading readiness tests devoted attention to it. Barrett's review of over 30 years of research helped to show that word or letter identification tasks generally resulted in higher predictions of first-or

second-grade reading achievement than did nonverbal tasks, such as copying shapes or identifying figures. This conclusion was also affirmed by de Hirsch, Jansky, and Langford (1966), who found letter and word tasks to be better predictors than visual or auditory discrimination, expressive language, or fine motor coordination tasks. Barrett also showed that knowledge of letter names (correlations usually around .55 to .65) was a better predictor than an ability to match letters directly or from memory (with correlations around .25). However, there was no best measure of word knowledge (see Gates, 1939, 1940).

Researchers have repeatedly found that auditory discrimination tasks correlate with reading ability or differentiate good from poor readers (e.g., Calfee, Lindamood, & Lindamood, 1973; Chall, Roswell, & Blumenthal, 1963; Durrell & Murphy, 1953; Dykstra, 1966; Gates, Bond, & Russell, 1939; Harrington & Durrell, 1955; Monroe, 1932; Schonell, 1948; Thompson, 1963; Wheeler & Wheeler, 1954). Correlations obtained are generally .40 or better. With respect to differentiation of good and poor readers, for example, out of the best 24 second grade readers tested by Thompson, 16 could perform adequately on an auditory discrimination task at the beginning of first grade. By contrast, out of the poorest readers, only one demonstrated adequate skill. In general, weakness in auditory discrimination of speech or word sounds has recurred as a major factor in reading disability. Since this deficit is often evident before or during initial reading instruction, auditory discrimination differences may not be caused

by faulty reading instruction, but by individual differences in prereading, presumably in the phonological awareness strand of prereading.

Recent research has been directed to analyses of more specific aspects of auditory discrimination, as well as to its development among young children. Some aspects were described earlier in the section on phonological awareness. Other possible sources of individual differences in auditory discrimination appear to be related to social class.

Kinsbourne (1976), who was interested in differentiating good from poor readers, found that low-SES entering first graders

> "often lack competence in some basic prereading skills, notably recognition of sequence and word-phoneme matching. The difficulty seems not to reside in inadequate power of information processing, but rather in the way children deploy their attention when looking or listening." (p. 154)

He concluded that these children should be encouraged to focus their attention properly by simplifying the learning materials to the utmost and avoiding distractions until the particular concept is acquired.

Wallach, Wallach, Dozier, and Kaplan (1977) compared middle-class and low-income children attending kindergarten or day care. On an auditory discrimination task the children had to listen to a word and select the correct picture from a pair of pictures. All the pictures referenced rhyming objects (e.g., whale, jail). Only one of the children made a single error. However, letter-sound discrimination tasks were very difficult for the low-income children. The results, which are summarized in Table 5, indicate the extreme differences between the two groups. Few

of the middle-class children obtained low scores on any of the three tasks, while comparably few of the low-income children had a perfect score.

Insert Table 5 about here.

Elkonin (1963), who assumed that children must be able to hear and distinguish sounds in words on the basis of their graphic representations in order to learn to read, devised a successful training procedure to test this assumption. He relied on a theoretical proposition of Galperin that the formation of a mental action involves: (a) establishment of a preliminary idea of the task, (b) mastery of the action with objects, (c) mastery of the action by speaking aloud, (d) transfer to a silent operation, and (e) final establishment of the mental action (mastery on an "intellectual plane"). To learn the letter-sound representation of words, children were presented with a picture depicting an object, under which there were boxes for the number of phonemes in the word.[19] Children were asked to fill each box with counters designating separate sounds, naming each sound. Gradually, the boxes, then the counters, are withdrawn so that the child reaches the third stage, in which he or she is aurally presented with a word and has to name all its sounds in turn.

Rosner (1974) tested a related procedure for training preschoolers to analyze language for purposes of learning to read. The program, one component of the Rosner's Perceptual Skills Curriculum, consists of 33 objectives, organized into eight levels. Briefly, the training, which stresses phonological awareness, begins by teaching children procedures

for separating sounds into distinctive units, then teaches them to segment into words, then to segment words into syllables, and finally to segment syllables into phonemes. Two groups of kindergarten children (one group was middle-class; the other was from an inner-city neighborhood) were tested, and a group of 26 inner-city nursery school children was trained according to the model. At the end of the school year, the nursery school children gained from a score of 2.7 to a score of 17.3. (In terms of Rosner's levels, this meant that the children could now segment words into syllables.) This score was significantly higher than the beginning of the year scores of either kindergarten control group. The training demonstrates that auditory analysis skills can be taught to preschool children and seem promising for facilitating later reading achievement.

Thus, the question "What should be the nature of prereading instruction?" is a complex question that extends beyond the purview of this paper. While it is apparent from the large differences in prereading among kindergarten children that more efficient means to help children might have a positive effect, it is not apparent what or how they ought to be taught. My recommendation at this time is to utilize the three-strand construct, devising opportunities for children in preschool programs to acquire knowledge about reading by reading and writing. Evidence from both longitudinal and cross-sectional research suggests that children will then begin to figure out how to break speech into word units. With informal or even haphazard help from parents or teachers, an appreciable number of children may then begin to realize that letters provide cues for spelling

and recognizing words and will learn some terms and rules that accompany reading. While many of the children's prereading conceptions could be partly wrong, they nonetheless will provide a meaningful structure for learning and remembering printed words and for coping with first grade reading tasks. Children who are not so prepared at home may be less likely to flounder in first grade if helped by teachers. Although more instructional research is needed to test the necessity and sufficiency of the three strands, the model provides a footing from which to study children's developing knowledge and to consider intervention procedures for preschool children.

Conclusion

The controversy about how beginning reading instruction ought to be approached is not unlike the age-old story of the blind men touching a different part of an elephant, with each describing a very different sort of whole creature. So it is with the prereader. We seem to have ignored what the child knows. The child does not enter school without some knowledge about what print is and how it is recognized. Most, if not all, children who live in our literate culture which has spawned printed labels and directions as a formal means of communicating notice print. Many, in addition, engage in prereading activities at home or in a preschool. Surprisingly, though, we have seldom considered that their perception of print can be characterized developmentally and is related to success in learning to read. In a sense, to return to the analogy of the blind men trying to understand the elephant, we have attended to extremities of the creature and dismissed its bulk. Some have noticed an extremity

that shows the importance of reading words in context, whereas others have observed from another angle the need for knowledge of the phonology, and still others have stressed understanding verbal concepts of reading. What I have tried to demonstrate here, first by analyzing the development of young children's awareness of how to read and then by relating the experimental studies to plausible characteristics of prereading, is that each of these positions is partly right, but lacking a broader perspective, each has been misleading. Each has ignored the interrelatedness of a child's entering knowledge.

At this point, we need more extensive studies of young children's prereading development. My interpretation of the research is that there are two or three levels of prereading development which mesh with three prereading strands. This needs further validation. In addition, I believe we need to understand how parents begin preparing their children for reading. To that end we must study individual differences in prereading development of children of middle- and lower-class families, of majority and minority cultures, and from rural and urban areas. Only then will we understand how to improve beginning reading instruction, and only then will it be possible to achieve major progress in reducing illiteracy.

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Footnotes

[1]Some authors have used the term "segmentation" while others have chosen "decoding" or "phonological coding." "Phonological awareness" was selected because of its implied sense of conceptual rather than skill-based knowledge and because of the directed intent to emphasize letter-to-sound relationship.

[2]Also disliked. Söderbergh noted her daughter's explanation of this fact for the word, what: "When we read 'tongue' we do like this"--she puts out her tongue--"but 'what'?"

[3]Materials contained 36 nouns and 20 pictures with token count of nouns being 278. There were 29 different function words, qualities, and operations, a token count of 876. Twelve different letters were used to make the words, 5 in upper and lower case. Stories were from Richard-Gibson Reading Materials.

[4]Materials contained 19 nouns and 5 pictures with token count of nouns being 103. Fifty-nine different function words, qualities, and operations appeared, with a token count of 713. Twenty-three different letters were used to make the words, 17 in upper and lower case. Stories were from Nisbet Reading Materials.

[5]Non-prereading (5 children in September but no one in May); Level 1, context dependency (18 in September and 12 in May); Level 2, visual recognition of letters and words (14 in September and 22 in May); and Level 3, letter sound analysis, reading (1 in September and 4 in May).

[6]One story, called Stop sign, was: Stop, car (picture of stop sign and car). Stop, bus (picture of stop sign and bus). Stop, truck (picture of stop sign and truck). Stop (picture of train crossing and track). For the train (picture of train). Tooot (no picture).

[7]According to parents, 13 of the 14 children were still interested in the books that we had given them at the end of the training and were reading them to parents, stuffed animals, imaginary friends, and baby sitters, all but two reading them "occasionally" or "frequently." Seven of the 14 parents reported heightened interest in naming letters, 8 in printing letters, 6 in spelling words, 11 in reading or recognizing words, and 8 in reading stories.

[8]When we were teaching three- and four-year-olds to read stories and asked them to point to each word as they read, they either ignored the pointing instruction or made a sweeping gesture under the whole line of print. They seemed to view each page, apparently, as a separate unit of print.

[9]Eventually, of course, the reader must consider the longer, sentence-length segment since phrases or sentences transcend the meaning of individual words. Liberman, Shankweiler, Liberman, Fowler, & Fischer (1977) suggest that skilled readers hold the shorter segments in short-term store until the meaning of the longer segment has been constructed. It is not known when, how, or even whether beginning readers learn this.

[10]An example from Menyuk (1976), where a child recoded, "He didn't go to school," as "He no do go school," indicates how verbs and functors in print and speech are often not well matched.

[11]See Mattingly (1972, Note 4, Note 8), also Downing (Note 2) for further discussion of linguistic awareness.

[12]Calfee (1977) showed that if children are told explicitly that a reversal is not an exact copy, they seldom select it. Thus, they can make the discrimination but before schooling are probably unaccustomed to considering rotations as different things.

[13]We have found that preschool children often believe that c has an /s/ sound. One child asked, "Stop has a c in it, right?" Another laughed at us for asserting that c said /k/. Several others named words beginning with s when we discussed the letter c. Thus it appears that letter names are used as clues for their sounds since there is no other explanation for the substitutions. This interpretation is also supported by work on preschool children's invented spellings of words (Read, 1971).

[14]This point is more fully discussed in Gleitman & Rozin (1977). Two of their examples suggest the complexity: The t sounds in grate and grater are not the same but are represented by the single grapheme, t. Also, there are differences in dialect (e.g., these spoken by a New Yorker is different from the same word spoken by a Midwesterner).

[15]Sixty percent of the lowest-ranked children were from one classroom. Observation of teaching indicated that the teacher followed closely the instructional manual that stressed reading for meaning. Other teachers, according to the authors, either supplemented this manual with phonics instruction or, using a different series, began with phonics instruction.

[16]A similar conclusion was made by Frederiksen (1978) in a comparison of good and poor high school readers.

[17]Social class is noted because Read's subjects as well as a group we tested (Mason, 1980) were upper-middle class. It is important to show that these linguistic insights have occurred among more typical children.

[18]Preschool children we tested best remembered the "biggest" word (e.g., elephant). Also, in testing remedial readers, we found that the two poorest readers knew only one word on our list, look, perhaps because it appears to have two eyes.

[19]Some changes would be necessary to use this technique with English words. The Russian alphabet is largely phonetic, with only one symbol for each sound. In English, training might begin with words that are so constructed, but training would be needed to exemplify digraphs (e.g., th, ea).

Table 1

Mean Number of Word-Reading Errors

Made During Instruction

Instruction Type	Meeting 2		Meeting 5		Meeting 7		Meeting 10	
	Nouns	Functors	Nouns	Functors	Nouns	Functors	Nouns	Functors
Letter-restricted materials, group setting, N = 8 groups	9	18	7	13	5	8	3	5
Letter restricted materials, individual setting, N = 42	9	15	9	20	8	15	5	9
Traditional materials, group setting, N = 8 groups	3	28	3	35	6	36	3	28

Table 2

Percentages of Children in Grouped Instruction

Who Offered Suggestions During Reading

Instruction Type	Meeting 2	Meeting 5	Meeting 7	Meeting 10
Letter-restricted materials	55	41	64	85
Traditional materials	65	30	25	12

Table 3

Average Percent Prereading Test Change Between

the End of Kindergarten and Beginning of First Grade

	Level I Performers (n = 6)		Level II Performers (n = 38)		Level III Performers (n = 6)	
	Percent Change	Time 2 Percent	Percent Change	Time 2 Percent	Percent Change	Time 2 Percent
Level 1 Tests						
Uppercase letter naming	25	77	1	100	0	100
Lowercase letter naming	12	67	4	94	2	100
Level 2 Tests						
Spelling 2- or 3-letter words	28	55	4	91	6	100
Consonant-sound identification	8	12	16	78	10	98
Level 3 Tests						
Word reading (isolated words)	1	4	15	39	33	93
Vowel-sound identification	1	2	4	22	22	68

Table 4

Mean Percent Error Responses that Letter Strings were Words

Group	Single-Letter Nonwords	Five-Letter Nonwords	Four-Letter Consonant Clusters	Four-Letter Vowel Clusters	Eleven-Letter Nonwords
Three to Four Years	54	83	80	80	87
Five Years	6	80	83	71	75
Kindergarteners	29	62	59	51	53
Grade 1	16	30	23	17	34
Grades 2 and 3	23	18	5	4	8

Note. Taken from Pick, Unze, Brownell, Drozdal, and Hopmann (1978).

Table 5

Percent Performance of Children from Two Social Classes

in Phoneme Recognition Tasks

Task	Perfect Score		Score of Seven or Less	
	Low Class	Middle Class	Low Class	Middle Class
Phoneme discrimination	4	76	22	1
Phoneme identification	5	73	32	1
Picture-sound discrimination	0	24	47	9

Note. Taken from Wallach, Wallach, Dozier, and Kaplan (1977).

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